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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,183	05/19/2005	Paraskevas Tsobanakis	CGLO10122US01	8068
38550 7590 06/18/2008 CARGILL, INCORPORATED LAW/24 15407 MCGINTY ROAD WEST WAYZATA, MN 55391			EXAMINER HANLEY, SUSAN MARIE	
			ART UNIT 1651	PAPER NUMBER
			MAIL DATE 06/18/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary**Application No.**

10/509,183

Applicant(s)

TSOBANAKIS ET AL.

Examiner

SUSAN HANLEY

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Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) 1-27, 34 and 37-49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 28-33, 35 and 36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's election of Group III, claims 28-36, and 3-hydroxypropionic acid as the α,β -unsaturated carboxylic acid in the reply filed on 3/11/08 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 1-27, 34 and 37-49 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 3/11/08.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 29-33, 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gokarn (US 7,186,541; cited in the last Office action) in view of Argyropolous et al. (US 4,970,334).

Gokarn discloses that 3-hydroxypropionic acid (3-HP), as in claims 32 and 33, is produced by a fermentation method and then separated from the biomass, as in step (a) of claim 1. 3-HP then serves as an intermediate to produce other compounds. For example, 3-HP can be heated in the presence of a catalyst to form acrylic acid. 3-HP can be chemically modified into a derivative such as an ester of 3-HP or esters of acrylic acid (col. 30, lines 33-45), as in claim 36. The disclosure of heating and a dehydration catalyst meets the limitations of part c), in part, of claim 1 because the 3-HP is dehydrated by a catalyst to form an α,β -unsaturated carboxylic acid. The catalyst is a metal or a mineral acid (col. 30, line 50 to col. 31, line 34). The disclosure of an acid catalyst meets the limitation of claim 35.

Gokarn does not specifically teach that the 3-HP is in a solution for the dehydration reaction, that the 3-HP is vaporized in the presence of a catalyst or that the dehydration catalyst is an acid.

Argyropolous discloses a method for the catalytic dehydration of glycol monoesters to produce unsaturated monoesters at elevated temperatures in the presence of a non-volatile acid catalyst (abstract). The acid catalyst is p-toluenesulfonic acid, sodium hydrogen sulfate, etc., (col. 5, lines 43-55) as in claim 35. The reaction takes place at temperature of 170 to 270 degrees C in a kettle equipped with a distillation column. This disclosure meets the limitation of a heated surface that serves to vaporize the solution, as in claim 30. The column temperature is controlled by the feed rate, pressure and reflux ratio under which the dehydration is being conducted (col. 5, lines 29-42). The limitation "vaporize" is interpreted to mean that at least one molecule of solvent is sufficiently heated to put it in the gaseous state. This disclosure meets the limitation that the solution is vaporized because a solution that is undergoing reflux has some molecules in the vapor state and others in the liquid state.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to effect catalytic dehydration of a beta-hydroxy acid or ester to yield an α,β -unsaturated carboxylic acid, or ester of, with an acid catalyst under refluxing conditions. The ordinary artisan would have been motivated to do so because Argyropolous discloses a method for the catalytic dehydration of glycol monoesters to produce unsaturated monoesters at elevated temperatures in the presence of an acid catalyst. The ordinary artisan would have had a reasonable expectation that the refluxing conditions using an acid catalyst would be successful to produce an α,β -unsaturated carboxylic acid, or ester of because the same type of reaction (e.g., a catalytic dehydration) is carried out.

Claims 29-33, 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gokarn (US 7,186,541; cited in the last Office action) in view of Bartoli et al. (2000).

The disclosure by Gokarn is discussed supra.

Gokarn does not specifically teach that the 3-HP is in a solution for the dehydration reaction, that the 3-HP is vaporized in the presence of a catalyst or that the heated surface comprises the dehydration catalyst.

Bartoli discloses the dehydration of beta-hydroxy ketones and beta-hydroxy esters to the corresponding α,β -unsaturated derivatives by reacting the beta-hydroxy compound with cerium (III) chloride in combination with NaI in refluxing acetonitrile (abstract). Bartoli discloses that a suspension of a beta-hydroxy substrate, such as 4-hydroxy-4-phenylbutan-2-one, and cerium (III) chloride hexahydrate is stirred in acetonitrile and brought to reflux for 10 hours. The organic layer was separated and the product was isolated (p. 1792, left column, under the heading "Representative experimental procedure). This disclosure meets the limitation that the solution is vaporized because a solution that is undergoing reflux has some molecules in the vapor state and others in the liquid state. The disclosure of cesium chloride in a suspension meets the limitation of a heated surface because cesium chloride, which is water soluble, is insoluble in an organic solvent, acetonitrile. Hence, it would remain as a solid in the suspension that is heated by the thermal source.

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to effect catalytic dehydration of a beta-hydroxy acid or ester to yield an α,β -unsaturated carboxylic acid, or ester of, with a solid catalyst under refluxing conditions. The ordinary artisan would have been motivated to do so because Bartoli discloses the dehydration of beta-hydroxy ketones and beta-hydroxy esters to the corresponding α,β -unsaturated derivatives by reacting the beta-hydroxy compound with cerium (III) chloride, a solid, in combination with NaI in refluxing acetonitrile. The ordinary artisan would have had a reasonable expectation that the refluxing conditions using a solid catalyst would be successful to produce an α,β -unsaturated carboxylic acid, or ester of because the same type of reaction (e.g., a catalytic dehydration to produce an α,β -unsaturated enone) is carried out.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 28-33, 35 and 36 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 4 and 11-14 of copending Application No. 11/377,052 in view of Gokarn (US 7,186,541). Claim 1 of '541 is drawn to a process for preparing an α,β -unsaturated carbonyl compound by reacting a β -hydroxy carbonyl compound at a temperature to produce said unsaturated products wherein one or more reaction products is capable of vaporizing from the reaction at said temperature upon conversion. Claim 2 recites that the substrate is β -hydroxypropionic acid. Claim 4 requires that the reaction takes place in a solvent. Claims 10-14 of '052 claim that the reaction takes place with a catalyst that is a solid, acidic, basic, etc.

The claims of '052 do not disclose that the source of the substrate, a β -hydroxy carbonyl compound, is a fermentation broth.

Gokarn discloses that 3-hydroxypropionic acid (3-HP), is produced by a fermentation method and then separated from the biomass. 3-HP then serves as an intermediate to produce other compounds. For example, 3-HP can be heated in the presence of a catalyst to form acrylic acid. 3-HP can be chemically modified into a derivative such as an ester of 3-HP or esters of acrylic acid (col. 30, lines 33-45). The catalyst is a metal or a mineral acid (col. 30, line 50 to col. 31, line 34).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize 3-hydroxy propionic acid obtained from a fermentate to

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serve as the substrate for the catalytic dehydration to acrylic acid via the method of '052. The ordinary artisan would have been motivated to do so because Gokarn specifically recommends that biochemical and chemical processes can be used together in a strategy to produce α,β -hydroxy unsaturated carbonyl compounds from β -hydroxy carbonyl compounds. The ordinary artisan would have had a reasonable expectation that one could employ a β -hydroxy carbonyl compound from a fermentate as a substrate because the structure of said obtained compound is the same as if it was obtained from a chemical catalog. Thus, one would expect it to react according to its structure and not its source.

This is a provisional obviousness-type double patenting rejection.

Claims 28-33, 35 and 36 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2 and 4-8 of copending Application No. 11/376,936 in view of Gokarn (US 7,186,541). Claim 1 of '936 is drawn to a process for preparing an α,β -unsaturated carbonyl compound by reacting a β -hydroxy carbonyl compound at a temperature to produce said unsaturated products wherein one or more reaction products is capable of vaporizing from the reaction at said temperature upon conversion. Claim 2 recites that the substrate is β -hydroxypropionic acid. Claim 4 is drawn to the employment of a dehydration catalyst. Claims 5-8 of '936 claim that the reaction takes place with a catalyst that is a solid, acidic, basic, etc.

The claims of '936 do not disclose that the source of the substrate, a β -hydroxy carbonyl compound, is a fermentation broth.

Gokarn discloses that 3-hydroxypropionic acid (3-HP), is produced by a fermentation method and then separated from the biomass. 3-HP then serves as an intermediate to produce other compounds. For example, 3-HP can be heated in the presence of a catalyst to form acrylic acid. 3-HP can be chemically modified into a derivative such as an ester of 3-HP or esters of acrylic acid (col. 30, lines 33-45). The catalyst is a metal or a mineral acid (col. 30, line 50 to col. 31, line 34).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize 3-hydroxypropionic acid obtained from a fermentate to serve as the substrate for the catalytic dehydration to acrylic acid via the method of '936. The ordinary artisan would have been motivated to do so because Gokarn specifically recommends that biochemical and chemical processes can be used together in a strategy to produce α,β -hydroxy unsaturated carbonyl compounds from β -hydroxy carbonyl compounds. The ordinary artisan would have had a reasonable expectation that one could employ a β -hydroxy carbonyl compound from a fermentate as a substrate because the structure of said obtained compound is the same as if it was obtained from a chemical catalog. Thus, one would expect it to react according to its structure and not its source.

This is a provisional obviousness-type double patenting rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SUSAN HANLEY whose telephone number is (571)272-2508. The examiner can normally be reached on M-F 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sandra Saucier/
Primary Examiner, Art Unit 1651

/Susan Hanley/
Examiner, Art Unit 1651